Materials Engineering Branch

TIP*

No. 057 Application of Aeroglaze Z306 Flat Black Thermal Control Paint

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Aeroglaze Z306 flat black paint is one of the more popular thermal control paints used on spacecraft because of its acceptable outgassing properties. Here are some simple instructions regarding its application and cure:

SUBSTRATES

1. Aluminum: Normally, aluminum alloys offer the best adhesion for Z306, particularly with sanded or grit blasted surfaces and solvent cleaning. However, better adhesion is obtained with the use of the Aeroglaze 9924 wash primer mixed 1:1 by volume of part A to part B and applied as a thin coat of 0.25 to 0.50 mils and air dried one to six hours before application of the Z306. The primer should not be thinned with a solvent and should be allowed to stand for 15 minutes before application. The preferred preparation of the surface includes abrasion and solvent cleaning prior to the primer application.

2. Magnesium, Stainless Steel, Silver and Gold: Reasonable adhesion is obtained on these surfaces with grit blasting, solvent cleaning and application of the wash primer.

3. Epoxy-fiberglass: A light sanding or grit blasting should be followed by an ethyl or isopropyl alcohol wipe and one hour at 65° C in an oven to drive off residual alcohol prior to the paint application.

PROCEDURE

A. Application: The paint should be mixed on a shaker, and the can should be opened as few times as possible with the time that it is left open kept to a minimum. The paint should be stored in a dry nitrogen purge once some of it has been removed, in order to obtain a reasonable shelf life, as it will cure with exposure to moisture. If addition of a solvent is necessary, use Aeroglaze 9958.

Application may be made by spray, dip, or brush to a final (dry) thickness of about three mils.

B. Cure: Because the paint cures with exposure to moisture, an air exposure of 30% RH, or more, will cure it tack-free in about 48 hours at room temperature. Two to four weeks are required for a full cure and optimum properties. When only partially cured, the paint is not resistant to solvents and will outgas contaminating constituents if exposed to thermal vacuum conditions.

Placing a partially cured paint in an oven at elevated temperature or in vacuum will delay the curing process until it is re-exposed to the humidity level recommended above.

The optical properties of the cured film are $\alpha_s \cong 0.94\text{-}0.96$ and $\varepsilon_n \cong 0.91$.